REMARKS

The rejection of Claim 1, under 35 USC 102(b), as being anticipated by Yoshiaki (7-287022) is respectfully traversed.

The Examiner is apparently relying upon a Derwent translation of Yoshiaki limited only to an Abstract. Although the Abstract is correct, the Examiner interpreted the Abstract incorrectly assuming the electrode segments 14a, 14b, 15a, 15b, represent two sets of electrode squares, with each set located on a different surface of the electrode. This is not shown, taught or suggested in the Abstract of Yoshiaki or in the description . To the contrary, the Abstract teaches and shows a single surface being divided up into electrode segments 14a, 14b, 15a and 15b, and this is supported in the description. The opposite or lower surface has only one electrode and this electrode covers the entire lower surface.

Applicant is at a loss to understand how the Examiner misinterpreted Yoshiaki as teaching two sets of electrodes with one set located on the upper surface and the other second set located on the lower surface. Moreover, there is no teaching in the Abstract of Yoshiaki supporting the alignment of electrodes in each set relative to one another as called for in Claim 1. Accordingly, the rejection of claim 1 under 35 USC 102(b) should be withdrawn.

Yoshiaki (JP7-287022) discloses an actuator for fine adjustment of a microscope probe to scan the surface of a specimen sample. As explained in the specification of Yoshiaki in paragraphs 0005 and 0006, the actuator comprises a hollow piezoelectric rigid cylinder 10 with multiple electrodes provided on segments limited to the outer surface of the cylinder. A single common electrode 44 is formed on the inner surface of the cylinder, along the entire circumference thereof. This is also supported in the drawings as shown in Fig. 1 and 4 respectively. A translated copy of paragraphs 0003, 0005 and 0006 of Yoshiaki into English is attached hereto. Also, attached is a translated copy of paragraphs 0019-0027, paragraphs 0029-0031 and paragraphs

0033-0035 respectively. The translated paragraphs are being provided to clearly support what is actually being described in Yoshiaki.

The outer surface of Yoshiaki as shown in Fig. 4 is divided into four segments representing electrodes 42a, 42b, 43a, and 43b, all of which are formed along the circumference at regular intervals of 90°. Two of the electrodes 42a and 43a are used for fine adjustment of the probe 41 in a horizontal X direction, whereas the other two electrodes 42b and 43b are used for fine adjustment of the probe along the opposite Y direction.

When sufficient voltage is applied between the inner electrode and all of the outer electrodes, the probe will move in the Z direction. When either positive or negative voltage is applied between the pair of electrodes 42a, 43a and the pair of electrodes 42b, 43b, the probe will move in the X or Y direction.

Yoshaki also teaches an additional strip-shaped electrode 11 formed on the outer surface of the cylinder 50 along the entire circumference thereof, and a notched groove 50a formed at one end edge of the cylinder and a conductive connection 13 formed therein so as to connect the inner electrode and the electrode 11, as shown in Figure 1. This additional electrode 11 is provided for the purpose of preventing electromagnetic induction noise or interference of a leak current caused by a tunnel voltage applied for driving the ceramic cylinder (see Para. 0024). Please note that Figure 1(b) is an exploded view of the cylinder of Figure 1(a).

In the embodiment of Figure 2, the electrodes 24a, 24b and 25a, 25b formed on the outer surface of the cylinder 50 are arranged in two lines. As explained above, when a certain voltage is applied between the inner electrode and all of the outer electrodes, the cylinder slightly deforms to move the probe in a Z direction. When either positive or negative voltage is applied between the electrodes 24a, 24b of one line and the electrodes 25a, 25b of another line, the cylinder slightly deforms to move the probe in the X or Y direction.

Judging from the purpose of Yoshiaki, i.e. fine adjustment of the position of the microscope probe, the cylinder of Yoshiaki is a rigid essentially solid structure which functions to locate and keep the probe at this desired position from which it may be slightly deformed by the piezoelectric effect. A piezoelectric belt as claimed is not a solid structure and inherently possesses flexibility.

In addition, Yoshaki has only one inner electrode which occupies the entire lower or inner surface. Yoshiaki does not teach a second set of electrodes and does not teach the arrangement claimed in claim 1 which results in aligned pairs.

Furthermore, in Yoshaki's piezoelectric actuator, the four outer electrodes must be strictly positioned at fixed intervals 90° apart (Figure 1), or must be arranged in two lines and shifted 90° with each other between the lines (Figure 2).

In contradistinction and as claimed in claim 1 of the subject invention, the piezoelectric ceramic belt comprises a piezoelectric ceramic layer having an upper surface with a first set of electrodes arranged at regular intervals along the circumference of the belt and spaced a given distance from both side edges of the belt and a second set of electrodes formed on the opposite lower surface of the belt aligned in position with the first electrodes on the upper surface of the belt. This arrangement is not taught in Yoshiaki and is not consistent with its teaching.

Moreover, as set forth in claim 1, the electrodes of each set are polarized by application of a high voltage to cause a piezoelectric effect in the ceramic layer between the electrodes with the electrodes in the first set acting as either positive or negative electrodes, relative to each respective electrode in the second set, i.e., the polarization occurs in pairs so that each pair of the electrodes and a portion of the piezoelectric ceramic layer between the electrodes form a distinct piezoelectric element having a totally different function and purpose from that taught in Yoshiaki.

In the present invention, the piezoelectric ceramic belt is adapted to be driven to function as a power generator or power source with the first and second set of

electrodes polarized by application of a high voltage to cause a piezoelectric effect in the ceramic layer between each electrode pair.

For all of the above reasons, the rejection of claim 1 under 35 USC 102 based upon the teach of Yoshaki, should be withdrawn.

The rejection of claims 2-6 under 35 USC 103(a) as being unpatentable over Yoshiaki '022 in view of Shuda (JP6-194173) is respectfully traversed.

Claims 4 and 5 have been amended and new Claim 7 added. Claim 4 now depends from claim 7 and claim 7 requires the electrodes in the first and second set to be equal in number forming complementary electrode pairs to create an electric dipote of ceramic particles between the electrodes of each pair aligned in the same direction. This is directly supported in the application on the bottom of page 2 and top of page 3.

Claims 2-4 and 7 depend from Claims 1 and are clearly different in structure and function from Yoshiaki. Shuda (JPG-194173) also does not teach the arrangement as taught in Claim 1. Accordingly, the rejection of Claims 2-4 and 7 should be withdrawn.

Claim 5 is an independent claim which has also been amended so that it is clear that the electrodes on the upper surface are equal in number and are arranged relative to the electrodes on the lower surface to form complementary electrode pairs such that upon application of a high voltage each pair of electrodes is polarized to cause a piezoelectric effect in the ceramic layer between each of the electrode pairs respectively, with the electrodes on the upper surface acting as either the positive or negative electrodes and the electrodes on the lower surface acting as counter electrodes.

Once again, the Examiner has misinterpreted the teaching in Yoshiaki in that there is only one inner electrode. Accordingly, Yoshiaki cannot achieve polarization of complementary electrode pairs.

Shuda (JP6-194173) discloses a piezoelectric vibrator for piezoelectric gyroscopes, comprising a round bar-shaped piezoelectric ceramic member 1 with electrodes formed on the outer surface thereof (see Para. 0001). As described in Para. 0012-0020, six electrodes 8-13 are in the shape of strips extending along the length of the ceramic bar and are arranged at regular intervals along the circumference thereof. Among them, three electrodes 9, 11, 13 arranged alternatively are connected with each other, by a common line extending along the circumference of the ceramic bar 1, to act as earth electrodes (see Fig. 1(b)). The remaining electrodes are one driving electrode 8 connected to input terminals 8a, and two detecting electrodes 10, 12 connected to output terminals 10a, 12a respectively. Please note that numerical reference 14 designates lead wires for connecting to solder pads 15 for the electrodes at one of its ends and to external terminals at another one of its ends (see Para. 0006 and 0018, Figures 2(a) and 4).

As is well known in the art, the ceramic bar 1 vibrates about its axis in one direction at a certain frequency by application of a certain voltage between the driving electrode and the common earth electrode. In such a state and if an external force is applied to rotate the ceramic bar at a certain angular acceleration in a direction perpendicular to the direction of said vibration, a Coriolis force is produced which will cause the ceramic bar to vibrate. This vibration can be detected as a potential difference between the detecting electrodes and the common earth electrodes by piezoelectric effects, so that the angular acceleration is obtained.

The piezoelectric element in Shuda is used as a vibrator for gyroscopes and comprises a piezoelectric ceramic round bar. The piezoelectric element in Shuda would never be formed into an endless belt, in that an endless belt could not function as taught by Shuda. Shuda's vibrator is able to produce potential differences in the piezoelectric bar between the electrodes that generates a signal for detecting the angular acceleration as a gyroscope, and therefore the amount of currents flowing between the electrodes is very small.

Accordingly, there is no basis for combining the teaching of Yoshaki with Shuda. Moreover, Shuda does not describe nor suggests the use of collector lines to collect electrical energy from each pair of electrodes as taught in the subject application. The piezoelectric ceramic member of the subject application is designed to function as a power generator or power source with electrical energy collected from each pair of electrodes.

For all of the above reasons, claims 5-6 are also clearly patentable over the combination of Yoshaki and Shuda.

Reconsideration and allowance of claims 1-7 is respectfully solicited.

Respectfully submitted,

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Date: March 14, 2005